



US Army Corps
of Engineers®

Engineer Research and
Development Center

Ongoing Research

HAMMER™

Handheld Apparatus for Mobile Mapping and Expedited Reporting

Problem

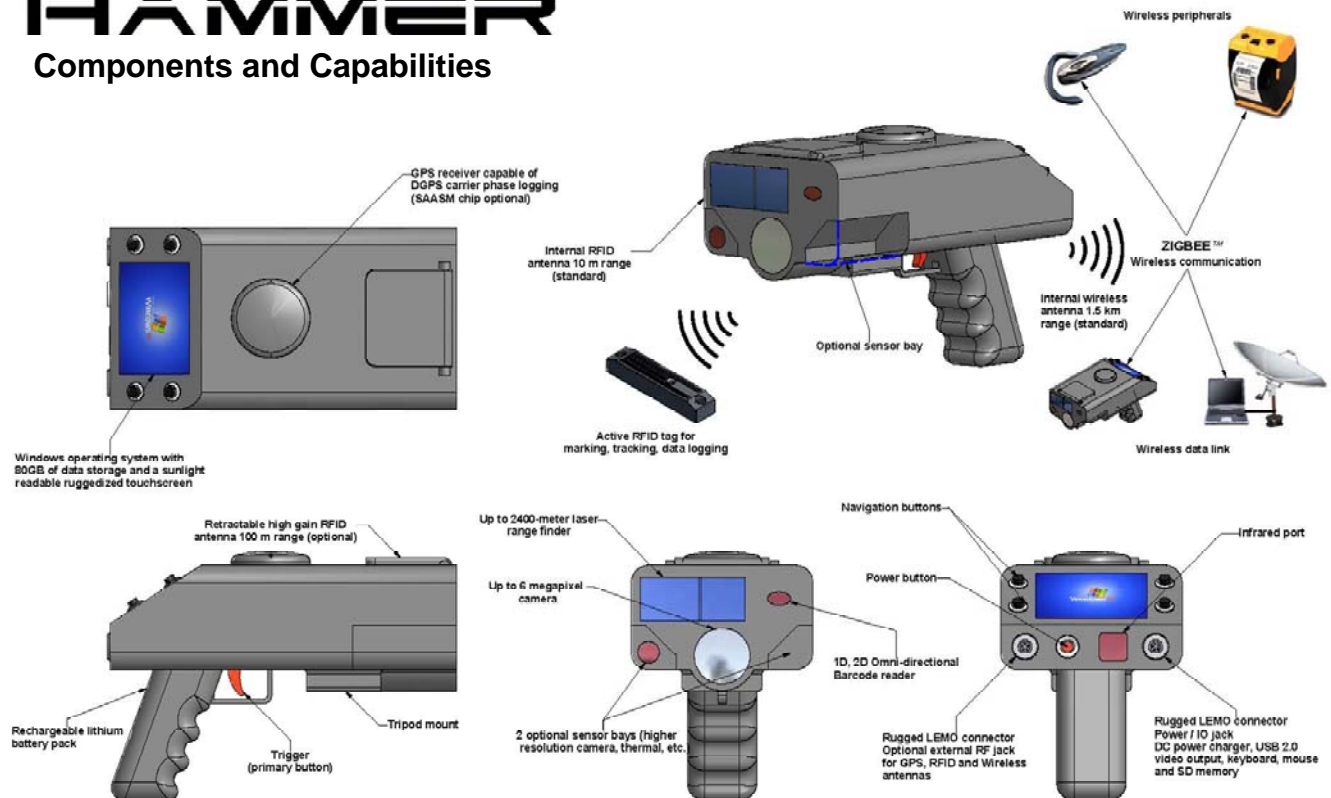
Acquiring and integrating geospatial, temporal, and sensor data is critical to improving real-time understanding of rapidly changing conditions. Conventional methods are labor intensive, involve multiple technologies that are not well integrated, and require numerous steps to produce consolidated maps, images, and reports. Key to maximizing situational awareness is the ability to rapidly collect disparate human, social, and cultural intelligence and bring the geospatial, temporal, and environmental context of the features and/or events together into a common operating picture (COP).

Description of Research

The “HAMMER™” (Hand-held Apparatus for Mobile Mapping and Expedited Reporting) offers an efficient solution to the problem of acquiring and processing multiple streams of critical information in real-time. ERDC-CERL, in collaboration with Compass Systems, Inc., is developing the HAMMER™. Capabilities include robust computing integrated with a geographical information system (GIS), a global positioning system (GPS) for mapping, marking, and tracking features, stand-off position acquisition, night vision, sensor arrays to detect and characterize environmental and cultural events, on-the-fly navigation, as well as audio and image capture and processing. Current research goals are to enable the device to operate (transmit and receive) inside buildings, tunnels, and caves with geospatial precision. Wireless network connectivity functions shall serve to exchange the suite of data within the COP. This seamless integration of multiple functions, combined with its ergonomic single-handed ease of use, will allow the HAMMER™ to be a highly effective tool to enhance situational awareness.

HAMMER™

Components and Capabilities



Expected Product

The HAMMER™ is modular in design. The technology may be configurable to accommodate a variety of “plug and play” components, wireless sensors (e.g., seismic, thermal, acoustic, temperature, chemical), and other peripherals via conventional connections (e.g., USB 2.0, LEMO™). The core unit includes a computer running a Windows™ XP operating system, which allows secure and encrypted robust computing and 80 GB of data storage capacity. An embedded ArcGIS™ software platform allows for integrated complex geographical information system (GIS) analysis. Base unit features include: position acquisition as well as stand-off positioning; distance, pitch, and roll measurements; and still and video processing. Users can collect data instantly via the a rapid event-capture trigger. Additional functions may include night vision, image stabilization and video pattern registration, voice recognition software, and biometrics for secure operations. Voice annotations, as well as audio communications, may be achieved through a wireless, hands-free, headset. A marking/tracking system may be used to mark and monitor dynamic situations and events across diverse landscapes, via active and/or passive Radio Frequency Identification (RFID) tags and hybrid bar code/RFID labels.

The HAMMER™ has a true sunlight readable display and can run continuously on commercially available rechargeable batteries. The kitset (i.e., handheld device, headset, tripod, vehicle/desktop docking station, power supply) will be hardened to MIL-STD-810F with respect to shock, water, particulate, and atmospheric effects. The global positioning systems (GPS) will comply with survey (<2 cm), or mapping (1-3 m) grade industry standards, or will be enabled with the Selective Availability / Anti-Spoofing Module (SAASM).

The HAMMER™ includes an encrypted data capture protocol, ensuring a “chain-of-custody” for all metadata. The on-board telecommunication features allow transmission/reception of secure, real-time audio, video, sensor, and geospatial data among users. This flexible system will allow the user to configure hardware components and pre-load customized software applications (e.g., environmental health site assessments, etc.). Field manuals, reports, forms, maps, images and GIS coverages may be uploaded prior to deployment. Programmable function buttons (including the trigger) allow the users to collect and synchronize data sets of varying complexity (e.g., a single photo or an image qualified with distance, bearing, geospatial coordinates, and feature attributes, etc.).

Demonstrations were conducted at the 25th Army Science Conference, November 2006, Orlando FL. A patent application has been submitted: United States Patent Applications Publication No. US 2004/013347 A1 (08 July 2004).

Potential Users

HAMMER™ offers an integrated suite of capabilities to serve a wide range of users: engineers, military planners, first responders, intelligence analysts, public works officials, environmental scientists, natural and cultural resource managers, surveyors, compliance officers, risk managers, real property managers, etc.

Projected Benefits

This tool enables more rapid, accurate, efficient (and lower cost) collection, analysis, and dissemination of digital data and reports. Users will be able to forecast, anticipate, and avoid impacts on their functional responsibilities. The HAMMER™ technology offers a single-handed solution that will improve situational awareness to a level not currently achieved by similar hand-held products.

ERDC Program Manager

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